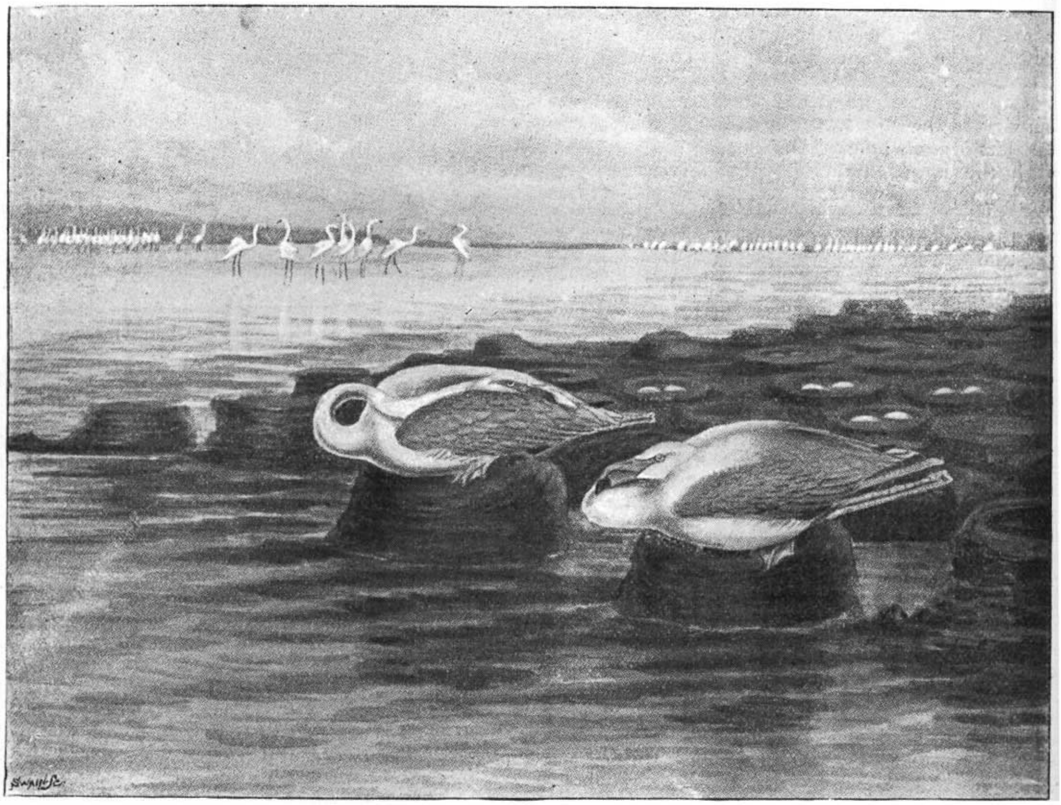
exploration of certain bird-islets lying off the shore of the marisma, success was at length obtained. On a low mud-island was found a "perfect mass of nests," and scattered round the main colony were numerous single nests raised above the water-level. From a distance of about seventy yards the sitting birds were observed most distinctly. "The long red legs doubled under their bodies, the knees (*scribe*, heels) projecting as far as or beyond the tail, and their graceful necks neatly curled away among their back-feathers, with the heads resting on their breasts—all these points were unmistakable." The problem was thus solved, for it had been asserted by previous authorities that the sitting flamingo, unlike other birds, straddles across its elevated nest, leaving its long legs dangling down on each side! It is only fair, however, to add that the true mode of the incubation of the flamingo has also been witnessed since, in the case of the North American species (*Phœnicopterus roseus*), by Sir Henry Blake, in the West Indian island of Abaco (see *Nineteenth Century*, December, 1887). Sir Henry has fully confirmed the accuracy of Mr. Chapman's observations.

Another curious discovery which we owe to the energy of Mr. Chapman is the existence of wild camels living and breeding in the "Bœtican Wilderness." The statement that camels were roaming about and reproducing their species in Europe at first met with much unbelief and even ridicule. There can be no doubt, however, on the subject. The camels were introduced from the Canaries in 1833, and for some years used as beasts of burden in the province of Cadiz. At the present time some stray descendants of these camels live and flourish in the marisma in a "wholly wild state," and are "practically ownerless."

Did space permit, we could well give further "elegant extracts" from this interesting volume, which is replete with information on the inhabitants of "Wild Spain," and their manners and customs. The numerous plates and smaller illustrations in the text are mostly excellent, and add greatly to the attractions of the work. We might, however, wonder that greater accuracy has not been secured as regards the spelling of some of the scientific names, especially when we are told that Mr. Howard Saunders's experienced eye has "gone through the proof-sheets. For example, *Haliäetus* is misprinted "*Haliæetus*," *Aëdon*, "*Ædon*," and *Rhopalocera*, "*Rhodopalocera*." Nor is it correct to call an Arabian camel (*Camelus dromedarius*) a "Bactrian" (*i.e. C. bactrianus*).

It is also now well known that the ichneumon of Spain is the same as the Algerian and Egyptian species (*i.e. Herpestes ichneumon*). It should therefore be no longer called *Herpestes widdringtoni*.



Flamingoes on their Nests.

NOTES.

The conditions under which the total solar eclipse on Sunday was observed seem, on the whole, to have been favourable. According to a telegram from Ceara, the clouds at Para Cura—where the British expedition in charge of Mr. A. Taylor was stationed—were heavy before contact, but afterwards dispersed, leaving a clear space for observation during totality. The photographs were believed to be satisfactory. The eclipse was seen at Bathurst, in West Africa, "in perfectly clear weather," and no doubt was entertained there that the British expedition under Prof. Thorpe, at Fundium, on the Salum River, had been equally fortunate. M. Bigourdan, one of the astronomers sent by the Paris Observatory to observe the eclipse in Senegal, has telegraphed to M. Tisserand, the Director: "Foggy sky; observed the four contacts; Vulcan not seen." Prof. Pickering has telegraphed to the *New York Herald* that the atmospheric conditions prevailing at Minasaris during the solar eclipse were perfect, and that the results of his observations were very satisfactory. He observed four streamers proceeding from the corona, two of which stretched over a distance of more than 435,000 miles. Several dark rifts were also visible extending directly westward from the moon's limb to the utmost limit of the corona. Several solar prominences attained great distinctness and brilliancy. During the eclipse the surface of the moon appeared almost of an inky blackness, by contrast with the dazzling brightness of the inner corona. The observations showed very conclusively that the present condition of the sun is one of great disturbance. The corona was whitish rather than red in tint. Many satisfactory photographs were taken.

The first Royal Society soirée of the present season will be held at Burlington House on Wednesday, May 10.

The International Sanitary Conference closed its proceedings on Friday last with the signing of a provisional convention by the representatives of Germany, Austria-Hungary, Belgium, France, Italy, Luxembourg, Montenegro, the Netherlands, Russia, and Switzerland. The delegates of the other Powers accepted the convention *ad referendum*. The ratification is to take place in Berlin within six months. According to the Berlin correspondent of the *Times*, the convention is divided into two chief sections. The first contains the international preventive measures to be taken against cholera as regards passenger and goods traffic, as well as regulations for obviating a dislocation of trade in case of an epidemic. The second section deals with the question of sanitation at the mouths of the Danube.

A complimentary dinner was given by the Royal Meteorological Society, at Limmer's Hotel, on Saturday evening last, to Mr. Henry Perigal, in celebration of his 92nd birthday, and of the completion of forty years' service as treasurer. A number of friends from other societies with which Mr. Perigal is connected also joined in the dinner. The President, Dr. C. Theodore Williams, in proposing the toast of the evening, gave some interesting particulars of the Perigal family, tracing their history back to some time before the Norman Conquest. The family have been remarkable for longevity. Mr. Perigal's father, who was 99¼ years of age when he died, was one of thirteen children, nine of whom attained respectively their 64th, 67th, 77th, 80th, 88th, 90th, 94th, 97th, and 100th year—the last five averaging 93 years 100 days. Their father and mother died in 1824, the former being nearly 90 and the latter upwards of 80 years of age. Mr. Henry Perigal was the eldest of six children, one of whom lived to the age of 85, and the youngest, Mr. Frederick Perigal, now in his 82nd year, was present at the dinner. Mr. Perigal briefly responded to the toast, thanking all present for their congratulations and kind wishes.

The "Universitas Jurievensis," formerly known as Dorpat University, celebrated the centenary of the birth of the astronomer, Wilhelmus Struve, who was a professor in the University, on Saturday last, the 15th inst., by an oration delivered in the large hall of the institution.

The Council of the Marine Biological Association has decided that in future a table in the Plymouth Laboratory may be rented for a single week, at a cost of thirty shillings. It is hoped that advantage will be taken of this arrangement in the shorter vacations. The other charges (£5 for a month, £25 for six months, £40 for a year) remain the same.

The Council of the Durham College of Science have addressed to the governors and other friends of the institution an urgent appeal for the means of relieving the college from its financial difficulties. During the last three or four years the college income has nearly balanced the expenditure, but this has been brought about only "by the teaching staff placing the financial interests of the institution in front of their own, sometimes going the length of surrendering their fees when it has not been obvious how they were to be paid out of the funds available, and in many cases providing, at their own expense, apparatus or assistance which, under ordinary circumstances, should have been supplied by the college." This is very creditable to the teaching staff, but it is absurd that such sacrifices should have to be made by the officers of an institution established and maintained for the benefit of the people of a great and wealthy district. When the facts about the matter are generally known, the authorities of the college ought to have little difficulty in obtaining what funds may be necessary for the full development of its work.

Another terrible earthquake occurred in Zante at seven o'clock on Monday morning. It was even more violent than the earthquake by which so much damage was done in February. Other shocks were afterwards felt. The town of Zante was almost destroyed, the church of St. Dionysius, the theatre, and the prefecture being among the buildings now in ruins. According to the accounts telegraphed on Tuesday, seventeen persons were killed in the town, and many injured. The villages in the island have not generally suffered so severely, but one village, Gaetani, has been totally destroyed, and there has been some loss of life. A correspondent of the *Times*, telegraphing from Patras, says that at the time of the principal shock the sea receded several feet from the shore, and that a severe shock was felt at Patras, at Pyrgos, and on the western shore of the Peloponnesus.

During the past week several depressions have traversed the extreme northern parts of our islands and Scandinavia, causing unsettled weather in those parts, which on Sunday extended southwards, and on the following day disturbed weather became fairly general over the United Kingdom. The rainfall in Ireland and Scotland was somewhat heavy, but in the southern districts the fall was slight, and at several stations no rain fell. In the neighbourhood of London the drought had lasted thirty days, a period which has been unparalleled at any season of the year during the last half century. The day temperatures have varied considerably in different parts, the maxima on several days exceeding 60° and even reaching 67° in the midland and south-eastern districts, while in the north they have ranged from 40° to 50°. Sharp frosts have occurred during several nights, the readings on the 14th being from 5° to 8° below the freezing point in the shade over central England, and falling to 19° on the ground. On Monday an anticyclone lay over the North Sea, again bringing fine weather to the south-eastern portion of England, but on the following day depressions were approaching our north-west coasts, and a gale was blowing in the extreme north, while the general conditions were of a more unsettled type than for some considerable time past. During the week ended the 15th inst. there was a considerable decrease in bright sunshine, but still it exceeded the mean in nearly all districts.

The Maryland State Weather Service publishes a monthly report in connection with the U.S. Weather Bureau. That for March contains an interesting article by Prof. W. B.

Clark, of the Johns Hopkins University, on the surface configuration of Maryland. The state is divided into three districts: the Appalachian Region, the Piedmont Plateau, and the Coastal Plain The inland border of the Coastal Plain marks the head of navigation, above which the inclinations of the valleys rise more steeply. This boundary is called the "Fall-line"; along it the larger cities of the Atlantic seaboard have grown up, and it marks out the leading highways of trade which connect the north and south. The prolongation of these three regions through other states is pointed out, and attention is directed to their importance as affecting temperature, rainfall, and the direction of the winds.

The Berlin Academy has recently made the following grants:—£50 to Dr. Wulf, of Schwerin, for prosecution of his crystallographic researches; £30 to Prof. Taschenberg, of Halle, for publication of his *Bibliotheca zoologica*; £50 to Dr. Herz, of Vienna, for carrying further the reduction of the observations at the Kuffner Astronomical Observatory; £175 to Prof. Selenka, of Erlangen, for a journey to Borneo and Malacca to investigate the development of apes, and especially the orang; and £25 to Prof. Keibel, of Freiburg, for his researches on the development-history of the pig.

The relations of the universities to the county councils in respect to technical education will be discussed to-day and to-morrow at a conference which will meet at Cambridge in accordance with arrangements made by the Cambridge University Extension Syndicate. The conference will be attended by representatives of county councils and universities, and by other persons interested in the subject. Cambridge has during the last year provided courses of lectures on various scientific subjects coming within the scope of the Technical Instruction Acts for eleven County Councils as well as for the technical education committees of other local authorities. A large part of the work done has consisted of simple scientific teaching in villages and small towns, and the attempt thus to bring the universities into closer relation with rural districts has naturally led to results of considerable interest and novelty. The results of such work and the most effective way of making progress in the future will be among the subjects discussed at the conference. Another item will be the scheme for systematic instruction in agricultural science at the university, devised by Prof. Liveing and others in cooperation with several of the county councils.

The Cambridge University Extension authorities have already announced as part of the programme of their summer meeting to be held in Cambridge next autumn five courses of practical work in science in the university laboratories and museums, the subjects selected being chemistry, electricity, botany, physiology, and geology. As, however, the date of the summer meeting, July 29 to August 26, is too early for many teachers in elementary schools whose holidays fall during harvest time, arrangements have also been made for two courses in agricultural chemistry, specially adapted to meet the requirements of teachers sent with scholarships by their respective county councils. Each course will extend from August 25 to September 12 inclusive, and will thus include sixteen working days, on each of which several hours' work in the university laboratory will be provided. One course—conducted by Mr. Fenton, one of the university demonstrators—is intended for students who have done little or no laboratory work, but have acquired a knowledge of theoretical chemistry, and will be similar to the course given last year and attended by about 120 county council scholars. The other course—conducted by Mr. R. H. Adie, one of the Cambridge Extension lecturers—will be more advanced in character, and will be adapted to students who went through last year's course with credit, or have done similar work elsewhere. Accommodation for 120 students can be provided at these two courses.

Last month a stone, which is valued at 17,000 rupees, was discovered at the Burma ruby mines. According to the *Pioneer Mail*, this is the most valuable ruby which has come to light for some considerable time past.

M. Édouard Branly gives a further account of his experiments on the loss of the electrical charge of bodies in diffuse light and in darkness, in this week's *Comptes Rendus*. He finds that a disc of polished aluminium, if it is experimented on a few days after being polished, behaves like most other metals; *i.e.* it slowly loses its charge, and the loss is approximately equal for the two kinds of electricity and independent of the kind of light to which it is exposed. If the disc has been freshly polished, however, even in diffuse light the loss is rapid, and is only slightly diminished by surrounding it by orange glass, thus showing the loss not to be due, to any great extent, to the rays at the more refrangible end of the spectrum.

In the current number of the *American Journal of Science* there is a paper by Mr. I. Pupin, describing a method of obtaining alternating currents of constant and easily-determined frequency. For this purpose he uses a small transformer, whose primary circuit contains an interrupter of peculiar design. This consists of a stiff brass wire, stretched between the pole pieces of two permanent horse-shoe magnets, and carrying at its middle point a short amalgamated copper wire. At every vibration this copper wire dips into a mercury cup and closes the circuit of a battery; the repulsion between the current in the wire and the magnets serving to keep up the vibrations. The tension, which can be adjusted without stopping the vibrations, is altered until the wire is in unison with a tuning-fork of known pitch. In order to diminish the intensity of the harmonics which are present when the current is interrupted in this way, the primary of the transformer is joined in series with another coil, having a movable iron core, and in parallel with a condenser of variable capacity. The capacity and self-induction of the circuit are by these means altered till the natural period of the circuit corresponds with the fundamental of the wire. The attainment of this condition is shown by the sparking at the break being a minimum. Under these circumstances the circuit acts as a resonator, and selects from the complex E.M.F. that harmonic with which it is in resonance, and strengthens it.

For some considerable time continuous records have been kept at Greenwich Observatory of the earth currents along two lines approximately at right angles. However, since the South London Electric Railway has been working, the records, except during a few hours of the night when the trains do not run, have been so disturbed as to be quite valueless. These disturbances show to what an extent the current, when there is no insulated return, strays, as the railway is nowhere within four miles of the Observatory. In order to continue the earth current records and if possible trace their connection with the disturbances of the earth's magnetism, Prof. Mascart has had two earth-current lines fitted with continuous recording galvanometers, placed in the Parc Saint-Maur Observatory, and has so selected his lines that one runs exactly north and south, and the other east and west. In addition to the above a continuous record is kept of the currents passing in an aerial circuit, which is at all parts insulated from the earth.

In the course of some investigations necessitating the elimination of small variations of atmospheric pressure, Dr. Carlo del Lungo constructed what appears to be a highly sensitive mercury barometer. As described in the *Rivista Scientifico-Industriale*, it consists of a vertical tube of 20 mm. bore and about a metre long, bent round at the bottom in the ordinary way, but having the open end closed by a steel cap screwed on to an iron collar attached to the tube. A long capillary tube of 1 mm. bore is attached at right angles to the main tube a little above the bend, ending in an open vessel. The amount of mercury is so adjusted that there is a free meniscus about the middle of the capillary tube. Any slight increase in atmospheric pressure will then cause the main column to rise, and the necessary mercury will be withdrawn from the capillary. A fall of pressure will be indicated by a forward movement of the meniscus in the horizontal tube. Thus the rise and fall of the mercury in the main tube is exaggerated in the ratio of the sections of the tubes, in this case 400 : 1. Hence it is possible to observe a variation of $\frac{1}{400}$ mm. Should the variation of the pressure be so large as to drive the meniscus out of the tube altogether, it can be brought back by screwing the steel cylinder up or down. In spite of the errors introduced by variations of temperature and the faults due to capillary adhesion, variation of sectional area of the tube, and impurities in the mercury and the glass, the instrument appears to be well adapted to the observation of small fluctuations of pressure, such as the diurnal variation and the small and rapid oscillations peculiar to windy days. On one such occasion an amplitude of two or three centimetres was obtained in the course of two hours, during which an ordinary barometer remained perfectly steady, and a Richard barograph showed only a faintly waved line.

IF we may accept literally Sir Edward Braddon's glowing descriptions of gardens in Tasmania, that island ought to be the paradise of horticulturists. Speaking the other day before the Indian section of the Society of Arts, he said of the garden he himself cultivated there for ten years : "All the year through that garden had its charms of colour and perfume to lavish upon me ; always there were life and growth in progress, and new delights unfolding themselves out of nature's bounteous lap." His monster pelargoniums, that stood from 3 to 4½ feet high, and had a circumference of 9 to 27 feet, were sources of increasing pride and pleasure to him, as they were of successive glories of flower. As for his fruit trees and vegetable garden, they yielded a never-failing supply of food for the table that in England, purchased of the greengrocer, would have cost about £100 a year. "Many another garden like unto mine is there," said Sir Edward, "in Tasmania and New Zealand, gardens in which all the fruits and flowers of the temperate zone flourish abundantly, and in which it is possible for a European to work all the year round without fear of sunstroke or frostbite." These panegyrics were uttered in the course of an address in which the speaker tried to persuade Anglo-Indians that after their term of service in the East they would find it pleasanter and more profitable to settle somewhere in Australasia than to return to England. The address is an interesting one, and may be read—with the discussion to which it gave rise—in the current number of the *Journal of the Society of Arts*.

THE Hornsey Local Board, Highgate, has set a good example to other Local Boards by organising an excellent museum of modern sanitary appliances. About two years ago it occurred to the Board that it might be well to bring together some specimens of the most improved fittings for the guidance of builders and others. Accordingly a suitable room was erected, and manufacturers were invited to send examples of their manufactures. In order to ensure the permanence of the museum it was stipulated that all articles deposited should become the property of the Board ; and thus an important collection—which now occupies seven rooms—has been gradually formed. It is open free to the public on week days, and a good catalogue of the contents of the museum has just been issued.

MR. ROBERT SERVICE, of Maxwelltown, writing in the new number of *The Annals of Scottish Natural History*, says it is somewhat surprising, considering the untold myriads of voles that have overrun the sheep pastures in southern Scotland for a year or two past, that so few variations in colour have been reported. He himself has not seen any noteworthy aberration among those he has observed in peregrinating through their haunts, but the shepherds have reported an occasional pied example. Mr. Service has, however, a very strong impression that the "hill voles" are decidedly of a more smoky tint than those to be found in the lower lands among the hedges and plantations. The latter seem to develop a much ruddier colour on the fur along the back, and the general tone of gray seems much brighter than that of the voles that have ravaged the upland pastures.

MR. THOMAS STEEL continues in the *Victorian Naturalist* for February his remarks on some zoological gardens he has visited. The collection at Rundwick Park, Sydney, contains some very fair specimens of various kinds, especially among the large carnivora and the monkeys ; but he thinks a visitor from abroad would be disappointed in the small number of indigenous animals. Melbourne and Adelaide seem to be better off in this respect. Of the Melbourne Gardens, as compared with those he has visited elsewhere, he has a high opinion. Nowhere has he seen more attention given to the rational housing and to the comfort of the animals.

OPPONENTS of the doctrine of evolution have often tried to support their view of the subject by reference to the supposed sudden appearance of metaspermic plants in the rocks of the Cretaceous period. In the *American Naturalist* for April Mr. Conway McMillan deals with this point in an article on "the probable physiognomy of the Cretaceous plant population." He undertakes to show, first, that the appearance of Cretaceous metaspermic plants is proved, by the fossils, not to have been sudden, but gradual, and consequently, in Cretaceous time, the general preponderance of plant-population was strongly coniferous, fern and cycadean ; and second, that the conditions of Cretaceous time were such that the new and scattered metaspermic plants were placed under circumstances similar to those in which to-day variation is most rapid and plasticity is greatest for each species and even for every individual.

SOME interesting notes on alligator shooting in Trinidad are contributed by Mr. S. Devenish to the February number of the *Trinidad Field Naturalist's Club Magazine*. In Trinidad it is commonly believed that if any one attempts to touch an alligator's nest, he runs great risk of being attacked by the mother alligator, who is always on the watch to defend her progeny. While surveying on the left bank of the Caroni, Mr. Devenish came once upon one of these curious constructions, and so frightened were his eight men at his going to examine and demolish it, that they all ran away to a distance of at least twenty yards, warning him of the danger of the "Maman Caiman," which was sure to attack him. However, having beside his bowie knife at his side, his cutlass in hand, he prepared for defence, and quietly demolished with perfect immunity the large nest, in which he found a number of eggs. Of these a few were blown for his collection, and the rest left to hatch near a little fountain in his garden. After a few days the hatching took place, and it was as curious as interesting, says Mr. Devenish, "to see the little alligators, still adhering to the shells by their umbilical cords, briskly showing fight when approached, dragging the shell behind them and rushing with open jaws at anything presented to them and madly biting it."

THE Royal Dublin Society has published in its Proceedings a list of some of the Rotifera of Ireland, by Miss L. S. Glascott. The list is the result of research carried on from May to October in 1891. The number of rare and new species obtained during this short period seems to indicate that the

Rotifera are well represented in Ireland, and Miss Glascott has been induced to issue her list in the hope that it may lead other observers to study the group.

Dr. John Struthers contributes to the current number of the *Journal of Anatomy and Physiology* an important paper on the rudimentary hind-limb of a great fin-whale (*Balænoptera musculus*) in comparison with those of the humpback whale and the Greenland right-whale. His object is to determine the interpretation which should be given to the occurrence of a part apparently so rudimentary as a thigh-bone of about the size of a pigeon's egg in a great whale. He decides that the presence of the bone in fin-whales cannot be accounted for from the point of view of function, and that the bone must be regarded only as "a vestige." In the course of his inquiry Dr. Struthers has had occasion to note the need for caution in the attempt to find a functional explanation of the presence of rudimentary structures. "In endeavouring," he says, "to assign uses to rudimentary structures, we have to keep in view that such parts may in reality serve no purpose of functional utility, may be meaningless except as the products of decreasing heredity or as the incidents of variability, and that the parts attached to such structures may be but remnants, or may be adaptations acquired amid the surrounding activities."

The purification of water more especially for drinking purposes has assumed quite a different character since the introduction and application of the bacteriological methods now in vogue. Novel processes have in consequence been devised, whilst those already in use have received an altogether new interpretation. In two recently published papers further contributions are made to both these aspects of the subject. V. and A. Babes, in "Ueber ein Verfahren keimfreies Wasser zu gewinnen" (*Centralblatt für Bakteriologie*, July 30, 1892), describe a series of experiments which they have conducted on the removal of micro-organisms in water by means of alum. Some years ago Leeds made some investigations on this subject, and showed that by the addition of one-half grain of alum to a gallon of water the number of microbes in fifteen drops was reduced from 8100 to 80. This material has, moreover, been employed for the purification of water on a large scale in America, the amount used varying according to the water, from one-half to six grains per gallon of water. In the above paper the authors record the use of very much larger quantities of alum than Leeds, and in all cases after agitating the water with this material, they obtained an absolutely sterile liquid, although the water contained originally as many as 1200 microbes in about twenty-five drops. The number of bacteria in the sediment of a water shaken up with alum was also investigated, and was found to contain but a mere fraction of the organisms originally present. In the second paper, "Reinigung des Wassers durch Sedimentirung" (*Centralblatt für Bakteriologie*, February 8, 1893), Percy Frankland details some further investigations he has recently made on the purification of water by sedimentation. This author conducted a series of experiments some years ago on the removal of micro-organisms from water by means of agitation with different solid particles, both in the laboratory and as practically carried out during the softening of water by means of lime in Clark's process. In the present investigations attention is directed to the bacterial purification which takes place during the storeage of water on the large scale in reservoirs. The following experiment may be cited, showing the nature of the results obtained:—The Thames water before flowing into the reservoirs of one of the London water companies contained 1437 microbes per c.c. (about 25 drops); on passing out of the first reservoir there were 318 present; whilst after passing through the second reservoir only 177 were present in the c.c. Both Frank and Schlatter, the former for the river Spree, and the latter for the river Limmat at Zürich, have pointed out the reduction in the number of bacteria which is exhibited in the course of a river's flow, and the above results show clearly how important a factor is sedimentation in this process of purification.

A full report of the second session of the International Congress of Experimental Psychology, held in London in 1892, has been published by Messrs. Williams and Norgate.

A little book which seems likely to be of good service to young students of geometry has been published by Messrs. Macmillan and Co. It is called "Exercises in Euclid, Graduated and Systematized," and is by Mr. William Weeks, lecturer on geometry, St. Luke's Training College, Exeter. The examples are grouped in sets, each set bearing upon, and serving to impress, some fundamental fact or principle which is stated in larger type at the head of it. Thus the object of the book is to build up the pupil's knowledge, and to develop in him gradually the power to grapple successfully with difficult deductions.

Some remarkably interesting illustrations of the zoological results obtained by the naturalists on board H.M. Indian marine surveying steamer *Investigator* are being published. They consist of plates with brief explanations of the figures. We have received Part I. of "Fishes," by A. Alcock, and Part I. of "Crustaceans," by J. Wood-Mason. In the former there are seven plates; in the latter, five.

"A Dakota-English Dictionary" has been published by the U.S. Department of the Interior. It is an enlarged and improved version of a work prepared by a missionary, the Rev. S. R. Riggs, and published by the Smithsonian Institution in 1852. Mr. Riggs died in 1883, but had been able to get the new edition of his dictionary ready for the press. The task of editing his materials has been fulfilled by Mr. J. O. Dorsey, who has made a special study of the Siouan language, including the Dakota, since 1871.

A new mode of preparing hyponitrous acid, $H_2N_2O_2$, eminently suitable for demonstrating the existence of this interesting lowest acid of nitrogen in the lecture room, is described by Dr. Wilhelm Wislicenus in the current number of the *Berichte*. It will doubtless be remembered that hyponitrous acid was first prepared in the year 1871 by Divers, by reducing nitrates with sodium amalgam. Zorn subsequently showed that the molecular composition of the acid was most probably represented by the double formula $H_2N_2O_2$. He prepared the ethyl salt and found it to be a substance suitable for a determination of vapour density; the numbers obtained upon making a series of such vapour density determinations indicated that its molecular composition was $(C_2H_5)_2N_2O_2$. Several years ago Victor Meyer described an interesting reaction of hydroxylamine, NH_2OH. He showed that nitrous acid and hydroxylamine mutually decompose each other with production of water and nitrous oxide gas. $NH_2OH + HNO_2 = 2H_2O + N_2O$. It was further shown that when concentrated solutions of hydroxylamine sulphate and sodium nitrite are mixed a rise of temperature and a violent evolution of nitrous oxide occur. Dr. Wislicenus now shows that even very dilute solutions of sodium nitrite and hydroxylamine hydrochloride although cooled by ice slowly evolve nitrous oxide, eventually suffering complete mutual decomposition. The explanation of these reactions between hydroxylamine and nitrous acid has hitherto been unknown. It is now shown to be due to the fact that hyponitrous acid is produced as an unstable intermediate product.

$$NH_2 . OH + NO . OH = HO . N : N . OH + H_2O.$$

It is a well-known fact that hyponitrous acid readily breaks up into nitrous oxide and water, hence the explanation of Victor

Meyer's reaction is at once apparent. To prove the fact Dr. Wislicenus shows that the silver salt of hyponitrous acid may actually be obtained from the solution at a certain stage of the reaction, and the experiment forms the best method yet described of demonstrating the formation and properties of hyponitrous acid. There is always a considerable amount of hyponitrous acid present in the slowly-effervescing liquid obtained by mixing solutions of hydroxylamine sulphate and sodium nitrite at the ordinary temperature. Much more, however, is present for a few minutes when the liquid is warmed to 50–60°. At this temperature the decomposition is sufficiently rapid to cause somewhat energetic effervescence, but by the immediate addition of a solution of silver nitrate the greater portion of the hyponitrous acid can be fixed and precipitated in the form of the bright yellow stable silver salt, $Ag_2N_2O_2$. The yield of the finely divided precipitate is about ten grams for every hundred grams of hydroxylamine.

WHEN it is desired to demonstrate this mode of formation of hyponitrous acid upon the lecture table, solutions of about three grams of hydroxylamine sulphate and the equivalent quantity of sodium nitrite are previously and separately prepared. The total amount of solvent water should not exceed two hundred cubic centimetres. When the time arrives to perform the experiment the two solutions are mixed and a little of the resulting liquid immediately decanted into a test glass, silver nitrate solution added, and the fact pointed out that the resulting precipitate of nitrite and sulphate of silver is white. The vessel containing the main quantity of the liquid is then transferred to a water bath warmed to 50°, when a rapid evolution of gas at once commences. The issuing gas may rapidly be shown to answer to the properties of nitrous oxide by inserting a glowing splint, and almost immediately silver nitrate solution should be added to the liquid, when the beautiful bright yellow silver salt of hyponitrous acid is precipitated.

NOTES from the Marine Biological Laboratory, Plymouth.—Last week's captures include the Polychæta *Hyalinœcia tubicola* and *Amblyosyllis* (*Gattiola*) *spectabilis*; the Mollusca *Ovula patula* and *Loligo media* (136 mm. in length of mantle!); the Decapod Crustacea *Nika edulis*, *Ebalia Pennantii* and *Cranchii*; and the Tunicata *Clavelina lepadiformis*, *Archidistoma aggregatum* and *Ferophora Listeri*. The "gelatinous alga" has now entirely replaced *Halosphæra viridis*, and both spherical and elongated forms are being taken in the townets in great profusion. A single specimen of the Cladoceran *Podon*, carrying embryos, has been taken for the first time this year. Among the many animals now breeding, the following have not previously been noticed: the Cephalopod *Loligo media*; the Leptostracan *Nebalia bipes*; the Schizopod *Macromysis flexuosa* (= *chamæleon*); the Macrura *Pandalus brevirostris* and *Hippolyte Cranchii*, and the Brachyuran *Porcellana longicornis*. The *Glaucothoë*-stage of *Pagurus* has also been taken.

THE additions to the Zoological Society's Gardens during the past week include a Black-bellied Weaver Bird (*Euplectes afer*), Pin-tailed Whydah Bird (*Vidua principalis*), an Orange-cheeked Waxbill (*Estrelda melpoda*), two Common Waxbills (*Estrelda cinerea*) from West Africa, two Amaduvade Finches (*Estrelda amandava*), two Indian Silver-bills (*Munia malabarica*) from India, presented by Miss Herring; a Greater Sulphur-crested Cockatoo (*Cacatua galerita*) from Australia, presented by Mr. H. H. Forsayth; four Red-backed Buzzards (*Buteo erythronotus*) from the Falkland Islands, two presented by Dr. Dale, and two presented by Mr. Vere Packe; three Upland Geese (*Bernicla magellanica*) from Patagonia, presented by Sir Roger T. Goldsworthy; a Herring Gull (*Larus argentatus*) British, presented by Mr. Thomas Owen; an Alexandrine Parrakeet (*Palæornis alexandri*) from India, presented by Mr. S. Hulme; a Banded-tailed Tree Snake (*Ahætulla liocercus*), a — Snake (*Dipsas cenchoa*) from Trinidad, presented by Messrs. Mole and Urich; six Green Tree-frogs (*Hyla arborea*) European, presented by the Rev. Clifford D. Fothergill; a Moorish Toad (*Bufo mauritanica*) from Tunis, a Banded-tailed Tree Snake (*Ahætulla liocercus*) from Trinidad, deposited; two Red Oven Birds (*Furnarius rufus*), a Melancholy Tyrant (*Tyranus melancholicus*) from the Argentine Republic, a white-eyebrowed Wood Swallow (*Artamus superciliosus*) from New South Wales, six Edible Frogs (*Rana esculenta*) European, purchased; a Gayal (*Bibos frontalis*, ♂) born in the Gardens.

OUR ASTRONOMICAL COLUMN.

THE PHOTOGRAPHIC CHART OF THE HEAVENS.—M. Lœwy in *Comptes Rendus* (No. 13) for March 27 adds a few more words with regard to the scheme which he has suggested for determining the coordinates of the centres of the clichés. Without such a method as his, or at any rate one that has for its object the same end (that is, of shortening the work), it seems that the work of determining the positions of the chief stars will extend over some period. With 22,054 plates covering 169 cm. and corresponding to a portion of the sky 4°·7 square, the average number of stars up to the eleventh magnitude is estimated as 250. Now it is not necessarily certain that on on all of these plates there will be stars whose positions are accurately known, and further, even if accurate places had once been obtained, our knowledge of their proper motions is not considered advanced enough to apply them in such an instance as this. Only the two following ways, then, seem to be left:—(1) To observe afresh with our meridian circles as many (say six) stars as will appear on each cliche and deduce their positions (thus eliminating proper motion), or (2) to adopt a system of triangulation, assuming we know the places of some of the more important position stars. M. Lœwy's method is based on the latter, in which he groups the clichés together; for instance, the first grouping would contain as many as sixteen square degrees, but the second, third, &c., would cover just twice this number. With regard to "le problème du rattachement" he says, "Malgré tous les soins pris pour exécuter les photographies dans des conditions toujours semblables, il est impossible que les coordonnées mesurées sur deux clichés voisins soient immediatement et rigoureusement comparable. Chacun d'eux, en effet, représente la projection d'une portion de la sphère céleste sur un plan déterminé, et les plans de projection relatifs à deux plaques voisines sont inclinés l'un sur l'autre d'un certain angle. Les poses ont pu être effectuées à des époques très différentes; on ne saurait donc s'attendre à ce que la situation des plaques par rapport à l'axe de la lunette, l'orientation l'échelle des mesures soient identiques dans les deux cas. Par suite il est nécessaire de faire subir aux grandeurs mesurées certaines corrections, si l'on veut qu'elles constituent un système unique et homogène de coordonnées." In his first memoir M. Lœwy has already given the formulæ, &c., for reduction, and in the one to which we refer below he gives us an application of his method.

In *Comptes Rendus* for April 4 (No. 14) M. Lœwy states the results that he has obtained in applying his method of determining the coordinates of the stars on the clichés for the Photographic Chart. As it would be impossible to give an idea of this computation without entering into the subject at some length, it seems best that we should leave it quite alone and refer our readers to the journal itself, from which he will get full information. Suffice it for us to say that in the different methods of "raccordement" based on twenty-six well determined positions, the probable error of the equatorial coordinates amounts nearly to $\pm 0''\cdot 1$, but "comme il faut encore admettre les erreurs réelles plus fortes qui les valeurs théoriques calculées, il devient evident que le degré d'exactitude obtenu, bien que suffisant, est loin d'être exagéré."

CATALOGUE OF SOUTHERN STAR MAGNITUDES.—In vol. xii. no. 1 of the *Memoirs of the American Academy of Arts and Sciences* will be found the results in catalogue form of Mr. Edwin Sawyer's determinations of the magnitudes of southern stars from 0° to −30° Declination to the 7th magnitude inclusive.